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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/834,297	04/12/2001	David R. Hembree	3592.5US (97-321.5)	6489

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EXAMINER

MITCHELL, JAMES M

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 05/08/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/834,297

Applicant(s)

HEMBREE, DAVID R.

Examiner

James Mitchell

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 08 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 and 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. This office action is in response to the amendment filed February 8, 2002.

#### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mostafazadeh (U.S 5,705,851) in combination with MacDonald Jr., et al. (U.S 5,905,638).
4. Mostafazadeh discloses a semiconductor assembly comprising a substrate (36) and a die (34) with a plurality of bond pads on a first portion of the active surface of said die (Line 58, Column 3) adjacent two edges (via sidewall edges), the die adhesively attached to said substrate (Lines 55-56, Column 3) and an encapsulant (52) covering a portion of said substrate, die and bond pads, and a heat sink (54) attached to a second portion of the active surface.
5. Mostfazadeh does not appear to disclose a gel elastomer contacting a portion of the active surface or the heat sink attached to the gel elastomer, however MacDonald (Fig 1) utilizes a gel elastomer (22) contacting a portion of the active surface (18) with a heat sink (25) attached to the gel elastomer.
6. It would have been obvious to one of ordinary skill in the art to incorporate an elastomer material between the heat sink and chip of Mostafazadeh in order to enhance

thermal conduction and to provide shock protection of the device as taught by MacDonald (Columns 5-6, Lines 65-6).

7. Claims 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mostafazadeh and MacDonald in view of Akram et. al. (U.S 6,081,027).

8. Mostafazadeh and MacDonald disclose the elements stated in paragraphs 4-6, but do not show a heat sink with a plurality fins thereon. However, Akram utilizes a heat sink with fins (Fig.2).

9. It would have been obvious to one of ordinary skill in the art to modify the heat sink assembly of Mostafazadeh and MacDonald by incorporating a plurality of fins in order to increase the surface area of the heat sink to increase heat dissipation as taught by Mostafazadeh (Column 4, Lines 16-21).

10. Claims 3-5, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barker III et al. (U.S 5,175,613) in combination with MacDonald.

11. Barker (Fig 2 ; Column 1, Lines 51-58) discloses a substrate (16) with a plurality of circuits on a portion thereof (Column 4, Lines 47-48), a die (24) having a plurality of bond pads (inherent with the contact of solder balls on the surface of a chip) located on the active surface thereof, and having a backside surface, a plurality of solder balls (50) connecting a portion of the plurality of pads of the die to at least a portion of the plurality of circuits on the substrate, a heat sink cap with fins (14) covering a compliant adhesive (Column 3, Lines 39-43) elastomer (52), the die, solder balls and a portion of the substrate.

12. Barker does not explicitly state that the elastomer is a gel filled with thermally conductive material, however MacDonald utilizes a gel silicone elastomer (silicone elastomer is chemically bonded and therefore inherently cross linked) filled with a thermally conductive material (Column 5, Lines 12-18).

13. It would have been obvious to one of ordinary skill in the art to form the assembly of Barker with a cross linked gel silicone elastomer filled with thermally conductive material between the chip and heat sink, in order to enhance thermal conduction as taught by MacDonlad (Column 6, Lines 2-3).

#### ***Response to Arguments***

14. Applicant's arguments with respect to claims 1-9 have been considered but are moot in view of the new ground(s) of rejection.

#### ***Conclusion***

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Swei (U.S 5,182,173), Toy et al. (U. S 5,937,222), Bolleson (U.S 6,249,436)

The prior art discloses in Swei the use of crosslinked silicone elastomer, in Toy and Bollesen the use of a gel elastomer with a heat sink assembly.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Mitchell whose telephone number is (703) 305-0244. The examiner can normally be reached on M-F 10:30-8:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703) 305-9883. The fax phone

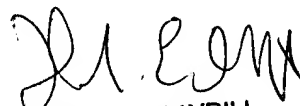
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numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3230 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

  
jmm

May 2, 2002

  
DAVID E. GRAYBILL  
PRIMARY EXAMINER